

VIL'NER, Yakov Moiseyevich, dots.; VOFNYARSKIY, Iosif Pinkhusovich, dots.; KOVALEV, Yakov Timofeyevich, dots.; KUZMENKOV, Vasiliy Ivanovich, dots.; LAZAREVICH, Ivan Grigor'yevich, dots.; SHUL'PIN, Igor' Aleksandrovich, dots.; AKALOVICH, N.M., red.

[Laboratory practice in hydraulics: Manual and methodological instructions on laboratory procedures in hydraulics; for correspondence and part-time students] Laboratornyi praktikum po gidravlike: Rukovodstvo i metodicheskie ukazaniia po provedeniiu laboratornykh rabot po gidravlik dlia studentov zaochnogo i vechernego obucheniia. [By] I.A.M.Vil'ner i dr. Minsk, Izd-vo M-va vysshego, srednego spetsial'nogo i professional'nogo obrazovaniia BSSR, 1961. 131 p. (MIRA 18:4)

1. Kafedra gidravliki Belorusskogo politekhnicheskogo instituta (for all except Akalovich).

SHCHUPIN, I. M.

The experiment of the Kirov kolkhoz of Gorki Oblast Moskva, Sel'khozgiz, 1948. 31 p.  
(Organizatsiia truda v kolkhozakh)

SHUL'PIN, Leonid Mikhailovich

SHUL'PIN, Leonid Mikhailovich. ... Promyslovye, okhotnich'i i khishchnye ptitsy Primor'ia. Vladivostok, 1936. xv, 436 p. (Dal'nevostochnyi filial Akademii Nauk SSSR.)

"Osnovnaia ornitofaunisticheskaia literatura po Primor'iu": p. 428-430.

Bibliographical footnotes.

"Obzor issledovaniia ornitofauny Primor'ia": p. 9-30.

NN

MiU

DLC: QL691.R9S5

SO: LC, Soviet Geography, Part I, 1951, Uncl.

SHUL'PIN, L.M. [deceased]

Data on mammals, reptiles, and amphibia of the Talas Ala-Tau. Izv.  
AN Kazakh.SSR.Ser.zool. no.7:65-83 '48. (MLRA 9:5)  
(Talas Ala-Tau--Zoology)

SHUL'PIN, L.M., [deceased].

Materials on the birds of the Aksu-Dzhabagly Preserve (Talas Ala-Tau).  
Trudy Inst.zool.AN Kazakh.SSR 2:52-79 '53. (MLBA 10:2)  
(Aksu-Dzhabagly Preserve--Birds)

SHUL'PIN, L.M. [deceased]

Materials on birds of the Aksu-Dzhabagly Preserve (Talas Ala-Tau).  
Trudy Inst. zool. AN Kazakh. SSR 6:158-193 '56. (MIRA 10:4)  
(Aksu--Dzhabagly Preserve--Birds)

SHUL'PIN, L.M.

Materials on the bird fauna of Aksu-Dzhabagly Preserve. Trudy  
Inst. zool. AN Kazakh. SSR 15:147-160 '61. (MIRA 14:7)  
(Aksu-Dzhabagly Preserve--Birds)

SHUL'PIN, L.V., inzh.

improve the organisation of piloting in harbors. Rech.transp. 18  
no.6:19 Je '59. (MIRA 12:9)

1. Kiyevskiy port.  
(Harbors) (Pilots and pilotage)



VORONTSOV, B.N.; SHUL'PIN, M.F.

Effective quality control in factory laboratories. Izv.tekh. no.2:  
57-61 Mr-Ap '56. (MIRA 9:7)  
(Mensuration--Quality control) (Engineering laboratories)

KUSAKOV M.M., KOSHEVNIK, A.Ya., NEKRASOV, D.N., CHIRKOVA, V.F., SHUL'PINA, L.M.

Thermal diffusion fractionation of polymer solutions. Dokl. AN SSSR 158  
no.5:1152-1154 O 1964. (MIRA 17:16)

1. Institut neftekhimicheskogo sinteza im. A.V.Topchiyeva AN SSSR.  
Predstavleno akademikom V.A.Kerginym.

SHUL'PINA, N. B.

SHUL'PINA, N. B. -- "Complications of the Operation of Removing a Cataract in a Clinicoanatomical and Experimental Study." Sub 24 Nov 52, First Moscow Order of Lenin Medical Inst. (Dissertation for the Degree of Candidate in Medical Sciences.)

SO: Vechernaya Moskva January-December 1952

KRASNOV, M.L., professor.; KRICHEVSKAYA, Ye.I., kandidat meditsinskikh nauk.;  
SHAKHNOVICH, S.I., kandidat meditsinskikh nauk.; SHUL'PINA, N.B.  
kandidat meditsinskikh nauk.; GEL'FMAN, A.Ya. vrach.

Dicoumarin in a thromboembolic syndrome of the retinal blood vessels.  
Vest. oft. 68 no.1:3-8 Ja-F '56 (MLRA 9:5)

1. Iz kafedry glaznykh bolezney Tsentral'nogo instituta  
usovershenstvovaniya vrachey (zav.-prof. M.L. Krasnov) i Moskovskoy  
glaznoy klinicheskoy bol'nitsy (glav. vrach-I.A. Lyubchenko)  
(RETINA--BLOOD SUPPLY)

KRASNOV, M.L., professor; SHUL'PINA, N.B., kandidat meditsinskikh nauk

Detachment of the choroid in surgery for glaucoma. Vest. oft. 69  
no.6:11-15 N-D '56. (MIRA 10:2)

1. Iz kafedry glaznykh bolezney (zav. - prof. M.L.Krasnov) Tsentral'-  
nogo instituta usovershenstvovaniya vrachey.

(GLAUCOMA, surg.

causing detachment of choroid)

(CHOROID, dis.

detachment, caused by surg. of glaucoma)

KRASNOV, M.L., professor; SHUL'PINA, N.B., kandidat meditsinskikh nauk

Treatment of uveal glaucoma. Vest. oft. 70 no.3:13-18 My-Je '57.  
(MIRA 10:8)

1. Kafedra glaznykh bolezney (zav. - prof. M.L.Krasnov) Tsentral'-  
nogo instituta usovershenstvovaniya vrachey  
(UVEA, dis.  
glaucoma, ther.)  
(GLAUCOMA, ther.  
uveal)

SHARTS, S.Ye., kand.med.nauk; SHUL'PINA, N.B.

Acelidine, a new Soviet miotic. Oft.zhur. 16 no.6:348-352  
'61. (MIRA 14:10)

1. Iz Moskovskoy glaznoy klinicheskoy bol'nitsy i kafedry glaznykh  
bolezney (zav. - zasluzhennyy deyatel' nauki prof. M.L. Krasnov)  
TSentral'nogo instituta usovershenstvovaniya vrachey.  
(MIOTICS)

SHUL'PINA, N.B.

Gonioscopy in primary and secondary (uveal) glaucoma. Vest. oft.  
74 no. 1:3-9 161. (MIRA 14:3)  
(GLAUCOMA) (OPHTHALMOSCOPY)



SHUL'PINA, N.B., kand.med.nauk

Pathohistological parallels in primary and secondary glaucoma.  
Vest.oft. no.3:41-46 My-Je '62. (MIRA 15:8)

1. Kafedra glaznykh bolezney (zav. - zasluzhennyy deyatel' nauki  
prof. M.L. Krasnov) Tsentral'nogo instituta usovershenstvovaniya  
vrachey i patogistologicheskaya laboratoriya (zav. - kand.med.  
nauk V.M. Shepkalova) Moskovskoy glaznoy klinicheskoy bol'nitsy.  
(GLAUCOMA)

SHUL'PINA, N.B., dotsent

Microgonioscopy as a method for the analysis of unsuccessful operations in glaucoma. Vest.oft. no.5:26-30 '62. (MIRA 15:12)

1. Kafedra glaznykh bolezney (zav. - zasluzhennyy deyatel' nauki prof. M.L.Krasnov) TSentral'nogo instituta usovershenstvovaniya vrachey.

(GLAUCOMA)

(OPHTHALMOSCOPY)

USSR / Human and Animal Physiology. Internal Secretion, Thyroid Gland. T

Abs Jour : Ref Zhur - Biol., No 15, 1958, No. 70346

Author : Shulpinov, S. S.

Inst : Kazan' Medical Institute

Title : The Iodine Content in the Soil and Food Products of the Mariyskaya ASSR in Connection with the Problem of the Etiology of Endemic Goiter

Orig Pub : Sb. nauchn. rabot, Kazansk. med. in-ta, 1957, No 1, 5-8

Abstract : Studies were made of the soil and food products in regions which are safe and unsafe with respect to endemic goiter. Tests of the soil were made at depths of 0.5 meter. The studies revealed an inverse relationship between the content of iodine in the soil and food products, and the distribution of endemic goiter. -- L. A. Kashchevskaya

Card 1/1

SHULPINOVA, Ye.N., inzhener.

Passivation during the shipbuilding process. Sudostroenie 23 no.7:  
(MLBA 10:8)

34-36 J1 '57.

(Corrosion and anticorrosives)

(Shipbuilding)

SHULPINOVA, Ye.N., kand.tekhn.nauk.

Using paints on an ethyl alcohol lacquer basis for painting  
drinking water tanks. Sudostroenie 24 no.1:43-45 Ja '58.  
(MIRA 11:2)

(Drinking water) (Tanks--Painting)

KOVALEVA, S.I., inzh.; SHULPINOVA, Ye.N., inzh.

Effect of a red-lead first coat on ethinoyl coatings. Sudostroenie  
24 no.5:53-54 My '58. (MIRA 11:6)  
(Ships--Painting) (Red lead)

S/229/62/000/001/001/002  
I060/I260

AUTHOR: Kovaleva, S.I., Engineer, and Shulpinova, <sup>4</sup>E.N., Engineer

TITLE: Application of anti-corrosive coating in shipbuilding

PERIODICAL: Sudostroyeniye, <sup>4</sup>no. 1, 1962, 65-67

TEXT: The purpose of this work is to study protective properties of coatings, based on zinc powder, which are being now extensively used in Soviet industry. The coating ПГС-1 (PS-1) of the following composition: Polysterene emulsion, mark A (ТУ 1827-51) (ТУ 1827-51) - 3.32%, Xylene (ГОСТ 10465-39) (ГОСТ 10465-39) - 33.53%, Zinc powder (ГМТУ 1657-51) (ТсМТУ 1657-51) - 63.15% was tested under the following conditions: 1. exposed to air at various temperatures including those below freezing point; 2. in a 3% solution of sodium chloride; 3. in service conditions on a section of a ship submerged for 18 months; 4. on surfaces subject to heating. The conclusions reached are:  
1. When exposed to air - PS-1 possesses highly protective properties. 2. On submerged surfaces - the protective properties of PS-1 are as good as these of passivity. 3. PS-1 dries quickly in low temperatures without losing its protect-

Card 1/2

Application of...

S/229/62/000/001/001/002  
I060/I260

ive properties. 4. In identical conditions, the protective properties of PS-1 in 4 layers are 5 to 6 times higher than those of zinc coating applied by galvanization.

Card 2/2



SHUL'SKIS, I. P.

Shul'skis, I. P. — "Comparative Histological Investigation of Various Species of Striped Muscles of the Horse." Acad Sci Lithuanian SSR, Inst of Biology, Kaunas, 1955 (Dissertation for Degree of Candidate of Biological Sciences).

SO: Khizhnaya Letopis', No. 23, Moscow, June, 1955, pp. 87-104.

SHVETS, M., kand.tekhn.nauk; SKUL'SKIY, V., inzh.

Deformations of large-panel buildings. Zhil.stroi. no.3:  
26-27 '62. (MIRA 15:9)  
(Precast concrete construction)

SHUL'T, Ioakhim; VLASOV-GOLOVATYY, A.N. [translator]; CHEREMUSHKINA,  
I.S. [translator]; KOSHELEV, Ye.G. [translator]; spetared.;  
SHAVERDOVA, A.I., red.; DOTSENKO, A.A., tekhn.red.

[Under sail] Pod parusom. Moskva, Gos.izd-vo "Fizkul'tura  
i sport," 1960. 405 p. (MIRA 14:2)  
(Sailing)

SHUL'TE, A., inzh.; NAZIMOV, M., inzh.

Apparatus for grain analysis. Zashch. rast. ot vred. i bol. 6  
no.9:17 S '61. (MIRA 16:5)  
(Seed adulteration and inspection)

5

SOV/137-59-3-6380

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 3, p 207 (USSR)

AUTHORS: Pelikh, V. N., Mladova, A. A., Shul'te, G. Yu., Kolyada, M. F.

TITLE: Quality Control of Malleable Iron  
(Kontrol' kachestva kovkogo chuguna)

PERIODICAL: Tekhn.-ekon. byul. Sovnarkhoz Zaporozhsk. ekon. adm. r-na,  
1958, Nr 3, pp 50-51

ABSTRACT: The mechanical properties of malleable iron are to a considerable degree determined by its chemical composition. The summary C and Si content, the other elements being stable, has a decisive influence on the structure of the metal. Being fairly time-consuming, the method of determining the C and Si content in the iron by chemical analysis was not adequate to ensure timely adjustment of the metal prior to casting it into molds. Instead, a high-speed inspection method utilizing production samples is employed. The samples are withdrawn at 30-minute intervals throughout the entire smelting operation. Bars, 50 mm in diameter and 200 mm long, are cast in sand molds where they are allowed to cool for 10 minutes; they are then immersed in water and broken into two approximately equal

Card 1/2

SOV/137-59-3-6380

Quality Control of Malleable Iron

sections. The character of the fracture may serve in judging the summary C and Si content. A relationship was established between the appearance of the fracture in a cast production sample and the chemical composition, the microstructure, and the mechanical properties of the metal.

A. S.

Card 2/2

BIDULYA, P.N.; SHUL'TE, G.Yu.; PELIKH, V.N.; MLADOVA, A.A.; SHERSTYUK,  
A.A.; MIROSHNICHENKO, L.S.

Nonmetallic inclusions in malleable cast iron. Lit. proizv. no.1:  
25-27 Ja '61. (MIRA 14:1)  
(Cast iron—Defects) (Nonmetallic materials)

BIDULYA, P.N.; SHUL'YE, G.Yu.

Effect of nonmetallic inclusions on the properties of malleable  
cast iron. Izv. vys. ucheb. zav.; chern met. 5 no.1:183-  
189 '62. (MIRA 15:2)

1. Moskovskiy becherniy metallurgicheskiy institut.  
(Cast iron--Metallography)  
(Iron founding--Defects)



BIDULYA, P.N.; SHUL'TE, G.Yu.; FELIKH, V.N.; MLADOVA, A.A.; KOSINSKIY, S.L.

Procedure for making castings of malleable cast iron. Lit. proizv.  
no.5:41 My '62. (MIRA 16:3)

(Iron founding)

BIDULYA, P.N.; SHUL'TE, G.Yu.; ANKVAB, K.M.

Gas content of malleable cast iron. Lit. proizv. no. 2:26-27  
F '65. (MIRA 18:6)

USSR/Medicine - Parasites  
Medicine - Nematodes

Oct 48

"Morphology and Biology of a New Nematode from the  
Lungs of Musk Deer," R. S. Shul'ts, N. K. Andrejeva  
2 1/2 pp

"Dokl Ak Nauk SSSR" Vol LXII, No 6

A new variety of Caprecaulinae, called Pneumocaulus  
kadenazii nov. gen., was discovered in the lung  
tissue of musk deer brought from the Altay National  
Reserve to the Moscow Zoo, differing from other  
varieties chiefly by the presence of strong, pre-  
sumably glandular formations along the lateral

60/49758

USSR/Medicine - Parasites (Contd)

Oct 48

caudal section in the male. Submitted by Acad  
K. I. Skryabin 21 Aug 48.

60/49758

R.S. SHUL'TE

ACC NR: AP7009076

SOURCE CODE: UR/0413/67/000/003/0053/0053

INVENTOR: Shtamberger, G. A.; Shul'ts, V. P.; Mezentseva, A. D.

ORG: None

TITLE: A device for measuring the intensity ratio between two electric signals.  
Class 21, No. 190985 [announced by the Institution of Automation and Electrometry,  
Siberian Department AN SSSR (Institut avtomatiki i elektrometrii Sibirskogo otdelniya  
AN SSSR)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 3, 1967, 53

TOPIC TAGS: electronic measurement, electronic signal, signal analysis

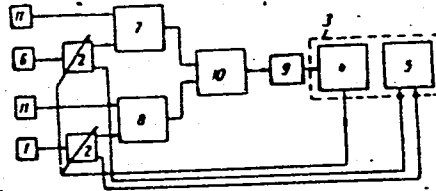
ABSTRACT: This Author's Certificate introduces a device for measuring the intensity ratio between two electric signals. The unit contains two receiving elements for the first signal, a single receiving element for the second signal, an adding stage and a subtracting stage. The input of the adder and that of the subtractor are each connected to one of the receiving elements for the first signal, while the outputs of these stages are connected to a multiplier. The multiplier output is connected through an averaging unit to the comparison result indicator. To improve accuracy in ratio measurement when both the signals to be compared are subject to interference, the installation is equipped with an extra receiving element for the second signal and two

UDC: 621.317.61.082

Card 1/2

ACC NR: AP7009076

interlocked variable dividers with identical transmission coefficients. The comparison result indicator is made up of a control unit and a final registration device. The receiving elements for the second signal are each connected through one of the dividers to the inputs of the adding and subtracting stages. The output of the averaging unit is connected through the control unit to the controlling input of the dividers. When mismatch reaches zero, the transmission coefficient of the dividers is fed to the final registration unit.



1--additional receiving element for the second signal; 2--dividers; 3--comparison result indicator; 4--servosystem; 5--final registration unit; 6--receiving element for the second signal; 7--adding stage; 8--subtracting stage; 9--averaging unit; 10--multiplier; 11--receiving elements for the first signal

SUBM CODE: 09/ SUBM DATE: 14Jun65

Card 2/2

PHASE I BOOK EXPLOITATION

SOV/5411

Konferentsiya po fiziko-khimicheskim osnovam proizvodstva stali. 5th,  
Moscow, 1959.

Fiziko-khimicheskiye osnovy proizvodstva stali; trudy konferentsii  
(Physicochemical Bases of Steel Making; Transactions of the  
Fifth Conference on the Physicochemical Bases of Steelmaking)  
Moscow, Metallurgizdat, 1961. 512 p. Errata slip inserted.  
3,700 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut metallurgii imeni  
A. A. Baykova.

Responsible Ed.: A. M. Samarin, Corresponding Member, Academy  
of Sciences USSR; Ed. of Publishing House: Ya. D. Rozentsveyg.  
Tech. Ed.: V. V. Mikhaylova.

Card 1/16

Physicochemical Bases of (Cont.)

SOV/5411

PURPOSE: This collection of articles is intended for engineers and technicians of metallurgical and machine-building plants, senior students of schools of higher education, staff members of design bureaus and planning institutes, and scientific research workers.

COVERAGE: The collection contains reports presented at the fifth annual convention devoted to the review of the physicochemical bases of the steelmaking process. These reports deal with problems of the mechanism and kinetics of reactions taking place in the molten metal in steelmaking furnaces. The following are also discussed: problems involved in the production of alloyed steel, the structure of the ingot, the mechanism of solidification, and the converter steelmaking process. The articles contain conclusions drawn from the results of experimental studies, and are accompanied by references of which most are Soviet.

Card 2/16

SOV/5411

Physicochemical Bases of (Cont.)

Arc Furnace Induced by Blowing Oxygen Into the Metal	149
Shul'te, Yu. A., and M. I. Kurbatov. The Effect of Manufacturing Parameters on the Properties of High-Manganese Steel	159
Iodkovskiy, S. A., and N. N. Sashchikhin. New Method of Making Austenitic Steels With a Given Quantity of Ferrite	167
Suchil'nikov, S. I. Extracting Valuable [Ferroalloy] Elements During The Process of Their Production	178
Berezhiani, V. M., and V. B. Baratashvili. Investigating the Nitrous Manganese Production Processes	184
Zamoruyev, V. M. On the Distribution of Titanium Between the Metal and Slag	189

Card 8/16



SOV/137-59-7-15728

Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 7, p 220 (USSR)

AUTHORS: Shul'te, Yu.A., Kurbatov, M.I., Tkachenko, A.S., and Slonim, D.M.

TITLE: Ways to Improve High-Manganese "G13L" Steel

PERIODICAL: Tekhn.-ekon. byul. Sovnarkhoz Zaporozhsk. ekon. adm. r-na, 1958, Nr 7, pp 24 - 29

ABSTRACT: Investigations were carried out into the effect of modification of "G13L" steel by Fe-Ti addition causing the development of Ti-nitrides in steel which limit the grain growth. It was stated that Fe-Ti additions increased 1.5 times the durability of crusher hammers. Improvement of mechanical properties of "G13L" steel is characterized by the following data:  $\sigma_b$  from 55.6 to 78.4 kg/mm<sup>2</sup>;  $\sigma_o$  from 39.0 to 42.0 kg/mm<sup>2</sup>;  $\delta$  from 19.8 to 28.8%;  $\psi$  from 17.5 to 28.9%;  $H_B$  from 206 to 218. For "G13L" steel Al is not a modifier but only a de-oxidizer.

T.F. ✓

Card 1/1

SHUL'TE, Yu.A.; SHITIKOV, V.S.; KURBATOV, M.I.

Reducing the amount of ferromanganese used in making G13L steel.  
Lit. proizv. no.6:40-41 Je '61. (MIRA 14:6)

(Ferromanganese)  
(Manganese steel—Electrometallurgy)

SHUL'TE, Yu.A.; KURBATOV, M.I.

Kind of nonmetallic inclusions in high manganese steel and  
their characteristics. Izv.vys.ucheb.zav.; chern.met. no.3:  
159-164 '60. (MIRA 13:4)

1. Zaporozhskiy mashinostroitel'nyy institut.  
(Manganese steel) (Nonmetallic materials)

1st AND 2ND EDITIONS  
 PROCESSES AND PROPERTIES  
 1st AND 2ND EDITIONS

38

Production of high-carbon tool steel in a basic electric furnace. Yu. A. Shulte. *Dones* 1933, No. 10, 531 S.  
 Tool steel contg. more than 0.6% C was prepd. successfully in an elec. arc furnace by the application of a basic slag.  
 S. L. Madorsky.

4

COMMON ELEMENTS  
 OPEN  
 MATERIALS INDEX  
 METALLURGICAL LITERATURE CLASSIFICATION  
 22



CA

9

Recent developments in the production of stainless steel. Yu. Shults. *Stal* 7, No. 15, 40 (1967), Chem. Zentr. 1968, 11, 158-60. The production of stainless steel at the Saporosh Steel Works in an elec. arc furnace with a 4-5 hr. melting period is reported. A charge of 8000 kg. of soft open-hearth iron (C 0.05, Mn 0.25, Si 0.15 and P less than 0.003%) well deoxidized with FeSi together with 150 kg. CaO is introduced into the furnace (25 min.). This is melted down by use of the max. furnace voltage (1 hr. 30 min.), after which the C content is 0.05% and the Mn content 0.05%. After the slag is drawn off (5 min.), a new slag-forming mixt. of 150 kg. CaO and 30 kg. spar is added. Then there are added in order 30 kg. 80% ferromanganese, 300 kg. 53% ferrochromium, a mixt. of 150 kg. CaO and 75 kg. 75% ferrosilicon, and finally 6 kg. Al. Two hrs. is required to complete the melting. The steel so produced contains C 0.12, Si 0.5, Mn 0.21, Cr 13.75 and Ni 0.15%. M. G. M.

AS 51.1 METALLURGICAL LITERATURE CLASSIFICATION

33113: 301 000 151

1ST AND 2ND ORDERS																										3RD AND 4TH ORDERS																									
PROCESSES AND PROPERTIES INDEX																																																			
<p><b>Utilisation of Chromium-Nickel and Chromium-Molybdenum Steel Scrap in Acid Arc Furnaces.</b> Yu. Shul'te. (Stal, 1938, No. 4, pp. 56-62). (In Russian). The author describes experiments on the melting of alloy steel scrap in acid arc furnaces. In the first period of melting the bath, which may contain 0.4-1.5% of chromium, is covered with an acid slag (<math>\text{SiO}_2</math> 45-55%, <math>\text{FeO} + \text{MnO}</math> 35-45% and <math>\text{Cr}_2\text{O}_3</math> 5-8%). The chromium oxide has been shown to be present in the slag in the uncombined condition and at a suitable temperature, depending on the carbon and chromium oxide contents; reduction of the latter by the carbon takes place. At the end of the first period the slag is completely removed and replaced by one consisting, for example, of 80% of quartz sand, 10% of lime and 10% of fireclay. The bath is deoxidised with ferro-manganese and the alloy composition is corrected. To the deoxidised bath is added ferro-silicon, in order to bring the silicon content of the steel to 0.3%. During tapping, the steel is deoxidised by adding 0.5-0.8 kg. of aluminium per ton. The method described is suitable for melting charges consisting entirely of alloy steel scrap. Data obtained during the large-scale trials of the method are given.</p> <p>1939-1</p>																																																			
<p>ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																																																			
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intense extraction of ferrous oxide from the metal. Diffusion of ferrous oxide into the slag is facilitated by stirring the bath. The final ferrous and chromic oxide contents of the slag are about 2.5% and 1.0% respectively, the amount of slag being 2.0-2.6% of the weight of the charge. Final deoxidation is effected with aluminium. Although some investigators have reported the detrimental effect of aluminium additions on the ductility of chromium-nickel structural steels, the present author points out that this does not occur provided that certain conditions are satisfied. These are essentially: (a) Thorough deoxidation of the steel prior to the addition of the aluminium, which is in fact achieved in the present process as a result of the use of the special deoxidising slag; and (b) the addition of an amount of aluminium slightly in excess of the critical amount necessary just to reduce the ferrous oxide contained in the steel. While it is possible to obtain ductile metal by low-temperature teeming of steel to which no final deoxidising additions have been made, this procedure cannot be recommended for practical application.

1ST AND 2ND ORDERS																										140 AND 4TH ORDERS																									
PROCESSES AND PROPERTIES INDEX																																																			
<p><b>The Chromium Reduction Process with Diffusional Deoxidation in Acid Electric Furnaces (the Zaporozhstal' Method).</b> Yu. Shul'te. (Iron and Steel, 1940, vol. 14, Oct., pp. 2-6). An English translation is presented of a paper on the theory and practice of remelting a charge consisting entirely of chromium-nickel or chromium-molybdenum structural steel scrap with carbon 0.25% min. and chromium 1.6% max. This paper appeared in Russian in Stal. 1939, No. 8, pp. 18-22 and an English abstract was published in Journ. I. and S.I., 1940, No. 1., p. 281 A.</p>																																																			
<p>ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																																																			
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1ST AND 2ND ORDERS										PROCESSIES AND PROPERTIES INDEX										3RD AND 4TH ORDERS									
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<p><b>Production of Structural Steels in Arc Furnaces.</b> Yu. Shul'te. (Stal, 1940, No. 2, pp. 23-25). (In Russian). The melting process in the arc furnace and certain structural characteristics of steels produced in electric furnaces are dealt with. The charge is made up of iron or steel scrap, pig iron and alloy steel scrap of suitable composition. The pig iron is intended to produce a carbon content after melting of 0.5% above that required in the finished steel. Ferro-manganese is also added to the charge to give 0.5-0.8% of manganese after melting. About 1% of lime is added to protect the metal against oxidation during melting and to remove phosphorus. Dephosphorisation by means of the slag, degassing of the bath, removal of non-metallic inclusions and preparation of the bath for deoxidation are achieved during the boil. For the latter purpose the bath is held at high temperature to obtain equilibrium between the carbon and the ferrous oxide. With the white slag process, slag is first removed and aluminium and powdered ferro-silicon are added. A basic lime-fluorapatite slag is made up and continuously deoxidised, mainly with ferro-silicon. During tapping 0.7 kg. of aluminium per ton of steel is added. In the combination method, after the removal of the oxidising slag, a basic lime-</p>																													
<p>ASH-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																													
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<p>RECORD #4</p>										<p>RECORD #5</p>										<p>RECORD #6</p>									

fluorspar slag is made and deoxidation is effected mainly with coke, with some ferro-silicon, with a final addition of 1 kg. of aluminium per ton to control the grain size of the austenite. The combination method is regarded as more efficient from the point of view of removing non-metallic inclusions. The fracture structure of cast steels is discussed with reference to the relation between the grain size thus revealed and the macro-defects. Fine grain is associated with freedom from macro-defects and *vice-versa*. Other conditions being equal, the fracture structure appears to depend on the final deoxidation practice.

SHUL'TE, Yu. A.

"The Effect of the Smelting and Teeming Technology Upon the Properties of Electric Steel." Dr Tech Sci, Inst of Metallurgy imeni A.A. Baykov, Acad Sci USSR, Moscow, 1954. (KL, No 14, Apr 55)

SO: Sum. No. 704, 2 Nov 55 - Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (16).

SHUL'TE, Yu. P.

Name: SHUL'TE, Yuriy Avgustovich

Dissertation: Influence of the technology of smelting and casting of electric steel on its properties, and Academic Title of Professor, Chair of Technology of Foundry Production (specialty: Electro-metallurgy)

Degree: Doc Tech Sci

Affiliation: Zaporozh'ye Inst<sup>of</sup> Agr Machine Building

Defense Date, Place: 2 Jun 55, Council of Inst of Metallurgy imeni Baykov, Acad Sci USSR

Certification Date: 30 Jun 56

Source: BMVO 5/57

*Shul'te Yu. A.*

Use of Vacuum in Metallurgy (Cont.) Moscow, 533 Izd-vo AN SSSR, 1958. 165pp.  
Trans. of a conf. on above (Inst. Metallurgy, AN SSSR ()) (ed. SAMARIN, A.M)

Vysotin, S.G. (Address)

123

Vysotin considers, on the basis of his investigations, that a very high vacuum and a longer-than-usual holding time are essential for the complete degasification of molten metal.

Zamotayev, S.P. (Address)

125

Zamotayev briefly describes tests conducted at the Uralmashzavod (Urals [Heavy] Machinery Plant) to determine the effect of vacuum treatment of the properties of steel.

Shul'te, Yu.A. (Address)

127

Industrial tests of the vacuum treatment of steel in the ladle, performed at the "Dneprospetsstal'" Plant, using methods developed by the Institute of Metallurgy of the Academy of Sciences, USSR, gave good results, especially in the case of transformer steel: content of carbon and sulfur was sharply reduced, and there were no rising or honeycombed ingots.

Card 12/16

18(3)

AUTHOR:

Shul'te, Yu. A.

SOV/163-58-4-9/47

TITLE:

Reoxidation Processes in Electric Steel (Protsessy povtornogo okisleniya v elektrostali)

PERIODICAL:

Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 4, pp 52 - 58 (USSR)

ABSTRACT:

Investigations of the author showed that the nature and distribution of metallic inclusions are decisive for the properties of steel. The examinations of the non-metallic inclusions were chiefly made by the method of metallographic analysis. The oxygen content in the melting process and in the finished steel was determined by the vacuum melting method at the laboratoriya metallurgii stali Instituta metallurgii AN SSSR (Laboratory of Steel Metallurgy at the Institute of Metallurgy of the AS USSR). Experiments under operating conditions were made at the works "Dneprospetsstal". - Formation of secondary oxide inclusions begins at tapping and lasts on during the whole period of casting. The electric steel undergoes secondary oxidation three times: during the tapping in the spout and in the jet, during the casting on the way from the ladle to the funnel, and in the iron mold (the

Card 1/3



Reoxidation Processes in Electric Steel

SOV/163-58-4-9/47

surface of the rising steel). The experiments showed that the tendency to form oxide coats on the liquid steel is mainly determined by the chemical composition of the steel. The elements related to oxygen - aluminum, titanium, vanadium and chromium - favor most the formation of oxide layers. Manganese and particularly the surface-active calcium reduce the formation of oxide layers. The degree of oxidation is marked by the specific surface of the contact between steel and air, and by the duration of such contact. The experiments show that tapping should be done by a solid jet of the highest admissible cross-section. Experiments showed that for a minimum development of oxide layers on the surface of the steel rising in the iron mold, the so-called "pure mirror" is the best variant. In most sorts of steel, however, casting with a "pure mirror" is not possible. By casting in a neutral medium, a metal free from inclusions is obtained. Examination of the oxide-layer crusts on the metal mirror in the iron molds showed that they have a very high content of oxygen: Ball-bearing steel - 0.05% and chrome-nickel-tungsten steel - 0.1%. The investigation of the macro-defects in electric steel showed that the formation of most hairline

Card 2/3

Reoxidation Processes in Electric Steel

SOV/163-58-4-9/47

cracks and fractures is connected with the reoxidation process at the casting of steel. An efficient means of preventing these defects is the protection from oxidizing and the maintenance of the surface of the steel rising in the iron mold in a liquid state. There are 5 figures and 3 Soviet references.

ASSOCIATION: Zaporozhskiy mashinostroitel'nyy institut (Zaporozh'ye  
Institute of Machine Construction)

SUBMITTED: March 1, 1958

Card 3/3

SHUL'YE, Yu. A.

KURBATOV, M. I. and SHUL'YE, Yu. A.

Vliyeniye tekhnologicheskikh faktorov plavki na svoystva vysokomergantse-  
vlastoy stali.  
report submitted for the 5th Physical Chemical Conference on Steel Production,  
30 Jun 1959, Moscow.

SHUL'TE, Yu.A.

Repeated oxidation processes in electric steel. Trudy Zapor.  
mashinstroi. inst. 4:19-32 '59. (MIRA 17:1)

18.3200

77453

SOV/133-60-1-14/30

AUTHORS: Shul'te, Yu. A. (Doctor of Technical Sciences, Professor),  
Tregubenko, A. F., Smolyakov, V. F., Maksimenko, V. D.,  
Frantsev, V. P., Leybenzon, S. A., Garevskikh, I. A.

TITLE: Electrometallurgy. Electroslag Remelting of Ball  
Bearing and Structural Chromium-Nickel-Tungsten Steels

PERIODICAL: <sup>1960</sup>Stal', 1960, Nr 1, pp 45-50 (USSR)

ABSTRACT: This is a description of a study of technology of electro-  
slag remelting of ShKh15, ShKh15SG, and 18KhNVA steels.  
The chemical composition of these steels (%) is as follows:  
ShKh15, C, 0.95-1.10; Mn  $\leq$  0.4; Si  $\leq$  0.35; Cr, 1.30-1.60;  
S  $\leq$  0.020; P  $\leq$  0.027; Ni  $\leq$  0.3; Cu  $\leq$  0.25; ShKh15SG, C,  
0.90-1.10; Mn, 0.20-0.40; Si, 0.15-0.35; Cr, 1.30-1.65;  
S  $\leq$  0.020; P  $\leq$  0.027; Ni  $\leq$  0.3; Cu  $\leq$  0.25; and  
18KhNVA, C, 0.14-0.21; Mn, 0.25-0.55; Si, 0.17-0.37; S  $\leq$   
0.03; P  $\leq$  0.035; Cr, 1.35-1.65; Ni, 4.60-4.90; W,  
0.8-1.20. Yu. V. Iatash and B. I. Maksimovich of the

Card 1/8

Electrometallurgy. Electroslag Remelting  
of Ball Bearing and Structural Chromium-  
Nickel-Tungsten Steels

77882

SOV/133-60-1-14/30

Institute of Electric Welding imeni Ye. O. Paton  
(Institut elektrosvarki imeni Ye. O. Patona) and  
N. A. Stetsenko of the "Dneprospetsstal'" Plant  
(zavod "Dneprospetsstal'") participated in the work.  
For industrial testing of the new method of electro-  
slag remelting, developed by the Institute of Electric  
Welding imeni Ye. O. Paton, of the Academy of Sciences  
of the UkrSSR, a furnace, designed and built by the  
Institute, was transferred in May, 1968, to the  
"Dneprospetsstal'" Plant. It was considered advisable  
to check the degree of purity of metal (the nonmetallic  
inclusions) on ball bearing steel and the mechanical  
properties on the structural 18KhNVA used for the most  
critical applications. All test melts were conducted  
on R909 installation. The inside diameter of crystal-  
lizer was 200 and 250 mm. The remelting was done using  
the 80-150 mm rods (electrodes). The weight of ingot

Card 2/8

Electrometallurgy. Electroslag Remelting  
of Ball Bearings and Structural Chromium-  
Nickel-Tungsten Steels

77453  
SOV/133-60-1-14/30

was 340 kg maximum. The investigation of ball bearing steel consisted of a study of 92 melts of ShKh15 steel ingots and of 90 melts of ShKh15SG steel. Some ingots were investigated as cast. The rest of them as forged billets. The process of electroslag remelting results in substantial change of silicon and sulfur content. The desulfurization in this process is very effective: on the average about 30%. The composition of the slag has a substantial influence on the development of oxidation processes and on the degree of desulfurization. It should be remembered that the purity of fluxes is a basic condition for obtaining high quality steel. The process of desulfurization during the electroslag remelting proceeds through the formation of volatile sulfur compounds. The process of electroslag remelting also results in minimum central porosity and other defects (see (Fig. 3).

Card 3/8

Electrometallurgy. Electroslag Remelting  
of Ball Bearings and Structural Chromium-  
Nickel-Tungsten Steels

77453  
SOV/133-60-1-14/30

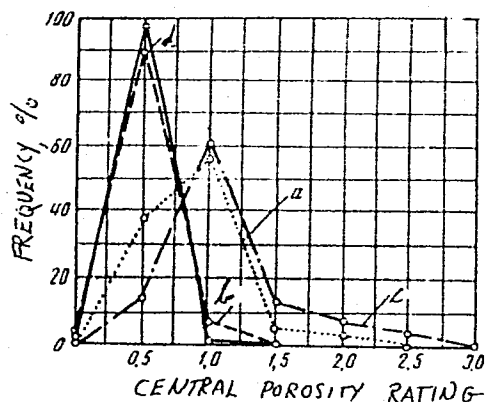


Fig. 3. Frequency diagram of distribution of melts according to the rating of central porosity. (a) Initial steel ShKh15; (b) ditto, electroslag steel; (c) initial steel ShKh15SG; (d) ditto, electroslag steel.

Card 4/8



Electrometallurgy. Electroslag Remelting  
of Ball Bearings and Structural Chromium-  
Nickel-Tungsten Steels

77453

SOV/133-60-1-14/30

This is the first time that the "Dneprospetsstal'" Plant produced ball bearing steel of such high density. For prevention of porosity the liquid steel bath in the crystallizer should be shallow and the velocity of poured-in liquid steel should be decreased to the point which gives a good surface of the ingot and a stable course of the process. For the study of the process of ingot formation during melt 243 (steel ShKh15SG) small additions of iron sulfide (in 30 g portions) were periodically introduced into the crystallizer. The experiment was conducted by B. I. Maksimovich. The process also improves the purity of metal (see Fig. 5).

Card 5/8

77453

SOV/133-60-1-14/30

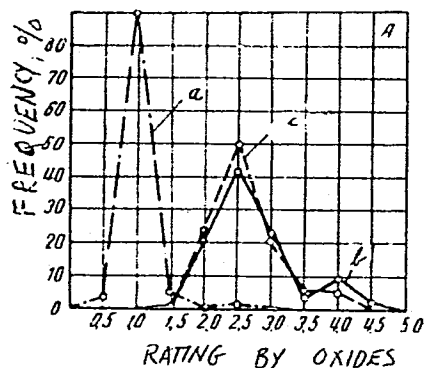
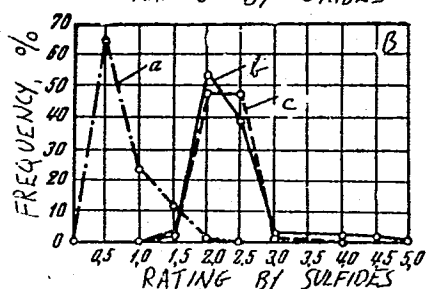


Fig. 5. Frequency curves of contamination by oxides (A) and sulfides (B) of electroslag and ordinary melts of ShKh15 Steel. (a) Electroslag; (b) ordinary melts in one group of furnaces; (c) ditto, in the other group of furnaces.



Card 6/8

Electrometallurgy. Electroslag Remelting  
of Ball Bearings and Structural Chromium-  
Nickel-Tungsten Steels

77453  
SOV/133-60-1-14/30

The 18KhNVA steel was investigated by the method of electroslag remelting (9 melts). The rolled billets of 110 mm diameter, rolled from the ordinary melt ingots, were used as initial material. Two ingots were investigated as cast. The others as forged billets. In the process of test remelting (as in the case of ball bearing steel) the silicon content was reduced by 30% and sulfur content by 41%. The amount of other elements practically did not change. The authors arrived at the following conclusions: (1) All mechanical properties of steel produced by the method of electroslag remelting are considerably higher than those of ordinary electric steel. The excellent density and homogeneity of metal, the absence of macrodefects, the high degree of purity from non-metallic inclusions, and the isotropy of mechanical properties give a right to recommend this method to the electrometallurgical plants for manufacturing steel for most critical applications. (2) It is also

Card 7/8

Electrometallurgy. Electroslog Remelting  
of Ball Bearings and Structural Chromium-  
Nickel-Tungsten Steels

77453  
SOV/133-60-1-14/30

recommended to continue the study of the basic parameters of the process regarding the improvement of crystallization conditions of ingots and the development of optimum composition of fluxes for additional increase of metal purity. There are 7 figures; 4 tables; and 3 Soviet references.

ASSOCIATION: Zaporozh'ye Machine Building Institute and  
"Dneprospetsstal'" Plant (Zaporozhskiy mashin-  
ostroyitel'nyy institut i zavod "Dneprospetsstal'")

Card 8/8

22315

S/133/61/000/004/004/015  
A054/A127

183200

AUTHORS: Shul'te, Yu. A., Doctor of Technical Sciences, Professor;  
Garevskiy, I. A., Engineer; Leybenzon, S. A., Engineer;  
Maksimenko, V. D., Engineer; Tregubenko, A. F., Engineer;  
Speranskiy, B. S., Engineer; Frantsov, V. P., Engineer, and  
Smolyakov, V. F., Engineer

TITLE: Nature of flaws in steel ingots produced by the electro-slag  
method

PERIODICAL: Stal', no. 4, 1961, 322 - 326

TEXT: The technology of electro-slag remelting was established by  
the Institut elektrosvarki im. Ye. O. Patona (Institute of Electrowelding  
im. Ye. O. Paton). A three-phase electroslog furnace (2250 kW) which can  
smelt ingots 750 kg in weight and 300 mm in diameter simultaneously in 3  
crystallizers has now been in operation for more than 2 years. In order to  
improve the process, the nature of the flaws occurring in electroslog-re-  
melted steel was studied and tests were carried out on ingots produced on  
an industrial scale, whereas an A-550 (A-550) laboratory plant, designed by

Card 1/8 S

22315

S/133/61/000/004/004/015

A054/A127

Nature of flaws in steel ingots produced by...

the same institute was used for the purpose of reproducing the defects. The crystallizer of this equipment was 100 mm in diameter, 600 mm in length, the ingots weighed 30 kg, remelting took about 35 minutes (at 40 v and 1.2 ka). In this process the ingot surface is not in contact with the atmosphere. The slag bath is rising at the same rate at which the ingot is smelting, while a thin slag layer forms on the crystallizer wall, the relief of which is closely reproduced by the ingot surface. Three zones can be distinguished in the smelting process. A non-uniform structure, having a serrated surface develops in the bottom zone during heating of the ingot. The metal contains slag inclusions and flux, at the place of inoculation. This zone could be reduced by applying a thermite mix (20% saltpeter, 20% aluminum and magnesium powder, 60% AH-Φ-6 /AN-F-6/ flux) at the exact centre of the electrode. The slag bath develops more rapidly in the heating period when maximum power is applied. By controlling the feed of the electrodes manually, any fluctuations in current intensity could be eliminated. At about 1800°C a homogeneous slag bath is formed, while at the same time the smelting of the second zone of the ingot also starts; the thickness of the slag lining on the crystallizer wall decreases to 1.0 - 1.5 mm. In this phase

Card 2/8 3

22315

S/133/61/000/004/004/015

A054/A127

Nature of flaws in steel ingots produced by...

the electric system of the crystallizer is switched to automatic operation. The electrode is fed into the slag bath at a rate corresponding with the optimum current intensity. Under these stabilized conditions the slag bath is regularly rising, leaving a smooth lining behind. The third, liquid-slag zone is the actual smelting zone, both in respect of electric power and physico-chemical effects. Here takes place the smelting of the electrode and the refining of the metal flow. The height and volume of this zone are the most important factors of the entire process. The slag content for all three zones was established. The greater the crystallizer-diameter, the less slag was found in the lining (Table 1). The ingot surface in the second zone is flawless, smooth and does not require any finishing. This is one of the greatest advantages of this method, which, however, can be obtained only by a stable electric system, faultless operation of the automatic furnace control as the slightest disturbance in any of these factors results in surface defects. These appear in the macrostructure and are similar to the impurities usually found in electrosteel. In 1959 data were compiled for ball bearing steel, showing the relation between the crystallizer height, diameter and amount of defects (Table 2). Thus, the greater the diameter of the crystallizer, the more flaws could be observed in

Card 3/8 s

22315

S/133/61/000/004/004/015

A054/A127

Nature of flaws in steel ingots produced by...

the ingot. As regards the smelting time, it was found that the first and the last periods produced the greatest number of defects. Metallographic study of faulty rods revealed sickle and spider-shaped cracks, lenticular inclusions, differing in colour from the flawless parts of the metal, in some templates occupying more than 50% of the total surface. In microhardness tests it was observed that in the impurified zones the hardness coefficients displayed a wide range of values. It could also be observed that the flaws penetrate fairly deeply, indicating that the factors impurifying the casting are active a long time (Fig. 5). Petrographic tests proved that the inclusions are similar to those forming in free crystallization and contain mainly calciumfluoride globules, needle-shaped corundum crystals, aluminum-calcium compounds. Among the impurities slag-inclusions, 1 - 2 mm in size, were found in irregular arrangement. Inclusions were present in the low-temperature zones of the metal, promoting the mixing of slag particles in the liquid metal. The lower the crystallization temperature, the more flaws were found. The viscosity of the metal increases due to intensive cooling and this promotes the capturing of slag particles. Based on the tests with the A-550 equipment the permissible minimum length of the

Card 4/05



SHUL'TE, Yu.A.; KURBATOV, M.I.; RIDNYI, A.A.; KOSTINSKIY, D.S.;  
KUGEL', R.V.; USHAKOV, A.D.

Manganese content in high manganese steel for track shoes. Lit.  
proizv. no.11:27-30 N '61. (MIRA 14:10)  
(Manganese steel---Analysis) (Steel castings)

SHUL'YE, Yu.A., doktor tekhn.nauk, prof.; KURBATOV, M.I., inzh.;  
GLADKIY, S.I., inzh.

Heat treatment of track blocks made of G13L steel. Metalloved.  
i term.obr.met. no.12:25-27 D '61. (MIRA 14:12)

1. Zaporozhskiy mashinostroitel'nyy institut.  
(Manganese steel--Heat treatment)  
(Tractors--Design and construction)

SHUL'TE, Yu.A.; SHITIKOV, V.S.; KURBATOV, M.I.

Economizing ferromanganese in making G13L steel in tractor-building plants. Izv. vys. ucheb. zav.; chern. met. 4 no.7:67-71 '61. (MIRA 14:8)

1. Zaporozhskiy mashinostroitel'nyy institut.  
(Steel--Metallurgy)  
(Ferromanganese)

SHUL'TE, Yu.A., doktor tekhn.nauk, prof.; GAREVSKIKH, I.A., inzh.;  
LEYBENZON, S.A., inzh.; MAKSIMENKO, V.D., inzh.; TREGUBENKO, A.F.,  
inzh.; SPERANSKIY, B.S., inzh.; FRANTSOV, V.P., inzh.;  
SMOLYAKOV, V.F., inzh.

Defects in steel ingots made by the electric slag process. Stal:  
21 no. 4:322-326 Ap '61. (MIRA 14:4)  
(Steel ingots--Defects)  
(Steel--Electrometallurgy)

S/032/61/027/004/008/028  
B110/B215

AUTHORS: Shul'te, Yu. A., Garevskikh, I. A., Maksimenko, V. D.,  
Leybenzon, S. A., Frantsov, V. P., Smolyakov, V. F., and  
Stetsenko, N. A.

TITLE: Scale for estimating nonmetallic inclusions in electro-  
scoriaceous steel

PERIODICAL: Zavodskaya laboratoriya, v. 27, no. 4, 1961, 422-424

TEXT: A high-purity metal is obtained by the electroscoriaceous method of melting. Inclusions in electroscoriaceous steel differ from those in ordinary steel in kind and character of their distribution. Traditional scales, therefore, cannot be used for the correct estimation of impurities, especially oxidic inclusions. The examination of nonmetallic inclusions in a large number of melts of electroscoriaceous steel allowed the development of a new scale (Fig.) in which the total area of dis-oriented inclusions, their number within the field of vision, and the admissible dimensions of the individual inclusions are taken into account (Table 1). Oxidic and sulfidic inclusions are shown in the photographs

Card 1/6

Scale for estimating nonmetallic...

S/032/61/027/004/008/028  
B110/B215

of the new scale. Large globular, oxidic inclusions are measured with an eyepiece micrometer. The degree of impurities in the ground face is estimated according to the field of vision with the largest number of impurities. The authors tested the scale and controlled 682 specimens of 200 electroscoriaceous melts of ball-bearing steel types  $\text{UX15}$  (ShKh 15) and  $\text{UX15CT}$  (ShKh15SG). At the same time, the specimen was estimated by the traditional  $\text{TOCT 801-47}$  (GOST 801-47) scale (Table 2). The indices of estimation by both scales differed but slightly, although the estimations of the individual melts differed largely from the control. Examinations of nonmetallic inclusions showed that the scale can also be used for other steels melted out by the electroscoriaceous method and for estimating melts in the vacuum arc containing the same type of inclusions. Ye. I. Boyko's collaboration is mentioned. [Abstracter's note: Complete translation]. There are 1 figure, 2 tables, and 2 Soviet-bloc references.

ASSOCIATION: Zaporozhskiy mashinostroitel'nyy institut (Zaporozh'ye Machine-building Institute); zavod "Dneprospetsstal'" ("Dneprospetsstal'" Plant)

Card 2/6

S/133/62/000/001/003/010  
A054/A127

AUTHORS: Garevskikh, I. A., Shul'te, Yu. A., Maksimenko, V. D., Speranskiy, B. S.

TITLE: The advantages and problems of improving the electrosag remelting of steel

PERIODICAL: Stal', no. 1, 1962, 39 - 41

TEXT: Investigations and experience show that a major factor affecting the efficiency of electrosag remelting (the intensity of the heat-transfer and refining) is the formation of liquid drops separating from the ingot, serving in the process as a self-baking electrode, immersed in the overheated (425 - 565°C above normal temperature) slag. The characteristics of the electrode drops were studied on industrial-scale equipment, at 55 V and 6kA. The drops were taken partly from the bottom zone of the slag lining, partly from the slag "cap" on the ingot. Their sizes were between 2.37 and 0.25 mm or even smaller. The drops are characterized by a high purity, visible inclusions can hardly be found. Coarse oxide inclusions disappear almost entirely, spheroidal inclusions decrease considerably. The statistical analysis of 2,140 samples obtained in 526 heats of ball bearing

Card 1/3

The advantages and problems of...

S/133/62/000/001/003/010  
A054/A127

steel (in 1960) showed that remelted steel displays a high degree of purity, most probably due to the intensive refining of the liquid steel by synthetic, iron-free slag at increased temperatures. The sulfide inclusions disappear in proportion to the sulfur content of the initial material. When remelting ball bearing steel, the degree of desulfuration attains 25 - 30%. For this kind of steel the electrode-ingot must not contain more than 0.007% sulfur. When remelting ingots with a 0.005% sulfur content, in the A 550 (A 550) equipment, with a 100-mm diameter mold, the sulfur content after remelting, decreased to 0.003% and no sulfide inclusions could be observed on the forged products (40 and 25 mm in diameter). Besides drop-formation, the composition of the fluxing agent also affects the refining process. 2,955 samples from 500 heats of ball bearing steel were remelted, using the AHΦ-6 (ANP-6) fluxing agent containing 14.8 - 32.9%  $Al_2O_3$ . The higher the aluminum oxide content of the flux, the purer was the steel, it was found. This is most probably due to the fact that aluminum oxide in the flux increases the desulfurizing activity of the slag (which consists of lime, fluorite, aluminum oxides). The structure of the slag made fluxible with various kinds of agents, was also studied. Part of the slags (Group A) is light-yellow coloured on the fracture surface, its grains are well-developed, have a red colour and are acicular.

Card 2/3



The advantages and problems of...

S/133/62/000/001/003/010  
A054/A127

they contain calcium fluoride in the form of oval grains, which are surrounded by an easily melting component, lighter in colour and with a refractive index of 1,604 - 1,610. Both phases are present in about the same volume. Moreover, there is also some corundum in this structure. Slags with such structural characteristics permit a smooth remelting process with low power consumption to be carried out. In some cases, however, the slag has a less bright colour and a coarse-grained structure, (Group B). The coating which surrounds the calcium fluoride grains is about 5 times less voluminous than in the former group. Large prismatic corundum grains make up about 30% of the total volume. With such a structure, the slag coating becomes coarse, remelting takes longer and more power is consumed, while the amount of sulfide and spheroidal inclusions also increases. The mineralogical composition of the fluxing agent, therefore, has a marked effect on the steel refining process and needs further improvement. There are 7 figures and 10 Soviet-bloc references. ✓

ASSOCIATION: Zaporozhskiy mashinostroitel'nyy institut (Zaporozh'ye Mechanical Engineering Institute)

Card 3/3

GLADKIY, S.I., inzh.; SHUL'TE, Yu.A., doktor tekhn.nauk

Multipurpose cast specimen. Mashinostroenie no.1:56-57 Ja-F  
'62. (MIRA 15:2)

1. Zaporozhskiy mashinostroitel'nyy institut.  
(Founding)

SHITIKOV, V.S., inzh.; SHUL' TE, Yu.A., doktor tekhn.nauk

Improving the technology of high-manganese steel production for  
crawler tractor track blocks. Mashinostroenie no.2:49-52 Mr-Ap  
'62. (MIKA 15:4)

1. Zaporozhskiy mashinostroitel'nyy institut.  
(Manganese steel--Metallurgy)

SHUL' TE, Yu.A.; GLADKIY, S.I.

Cast specimens for controlling the mechanical properties of steel  
castings. Lit. proizv. no.4:5-8 Ap '62. (MIRA 15:4)  
(Steel castings) (Founding--Quality control)

S/128/62/000/012/001/003  
A004/A127

AUTHORS: Shul'te, Yu. A., Gladkiy, S. I.

TITLE: Improving the electrosmelting of steel

PERIODICAL: Liteynoye proizvodstvo, no. 12, 1962, 1 - 4

TEXT: It is pointed out that some 90% of shaped steel castings produced in the USSR are made of electric steel, while about 75% of all electric steel castings are made from medium-carbon steel grades - mainly of 25Л (25L), 35Л (35L) and 45Л (45L) steel smelted chiefly in electric furnaces with acid lining. The authors emphasize that the high quality level obtained in the production of steel castings are due to a considerable degree to the high final Al-addition of 1.0 kg/ton or more. A number of references are cited recommending the increase of Al-additions in medium-carbon steel to 2 kg/ton which would improve the quality of steel castings still further. It is stated that the reason for important problems of acid electrosmelting being investigated only to a lesser degree, such as the effect of the duration of the casting operation, the nature of rimming of the pool, the slag composition, the degree of silicon re-

Card 1/2

ACCESSION NR: AT4023777

S/2723/63/000/002/0067/0076

AUTHOR: Karpenko, G. V.; Stepurenko, V. T.; Babey, Uy. I.; Shul'te, Yu. A.;  
Mikhaylov, P. A.

TITLE: Corrosion resistance and fatigue strength of ShKh15 steel after electros slag  
smelting

SOURCE: AN UkrRSR. Insty\*tut mashy\*noznavstva i avtomaty\*ky\*, L'viv. Vliyaniye  
rabochikh sred na svoystva materialov (Effect of active media on the properties of  
materials), no. 2, 1963, 67-76

TOPIC TAGS: electros slag steel, electros slag remelting, steel ShKh15, steel corrosion  
resistance, steel fatigue strength, corrosion, corrosion resistance

ABSTRACT: The Institut elektrosvarki im. Ye. O. Patona AN USSR (Institute of  
Electric Welding) has developed a method of electros slag smelting which is now in wide  
use to decrease the number of nonmetallic inclusions and thus increase the corrosion  
resistance of steel. The purpose of the present paper was to determine the effect of re-  
smelting on contamination of ShKh15 steel with oxides, sulfides, and air bubbles and the  
corrosion resistance and corrosion-fatigue strength of this steel, in both the perlite-  
ferrite and martensite states, in 3% sodium chloride. The results showed that electros slag

Card 1/3

ACCESSION NR: AT4023777

smelting of ShKh15 steel in the ZMI machine decreased the content of impurities by 2-2.5 units and the porosity at the center by 0.5 units. As shown in the Enclosure, smelting increased corrosion resistance by up to 15% in 3% sodium chloride, but increased it only insignificantly in air. Smelting increased the corrosion-fatigue strength of ShKh15 steel by up to 40% in the martensitic hardened condition and by up to 20% before hardening. However, lowering the quantity of impurities below a certain value did not affect the corrosion and corrosion-fatigue strength of the steel. "The thermal treatment was carried out by F. P. Yanchishin (Cand. Tech. Sci.) and Eng. K. P. Tabinskiy." Orig. art. has: 4 figures, 4 tables and 3 formulas.

ASSOCIATION: Insty\*tut mashy\*noznavstva i avtomaty\*ky\*, AN UkrSSR, Lvov  
(Institute of Machine Technology and Automation, AN UkrSSR)

SUBMITTED: 00

DATE ACQ: 10Apr64

ENCL: 01

SUB CODE: MM

NO REF SOV: 004

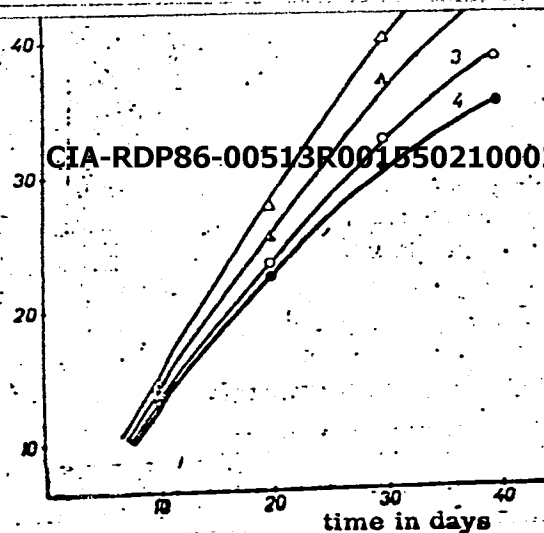
OTHER: 000

2/3

Card

corrosion in 3% sodium chloride:

1 - steel from a usual smelt (melt No. 314822), perlite-ferrite; 2 - steel after electroslag smelting (melts No. 18, 28, 33), perlite-ferrite; 3 - steel from a usual smelt (melt No. 314822), martensite; 4 - steel after electroslag smelting (melts No. 46, 48, 53), martensite.



Card

3/3

L 9978-63

ACCESSION NR: AP3001376

EWf(q)/EWT(m)/BDS--AFFTC/ASD--JD

S/0148/63/000/005/0076/0080

AUTHOR: Shul'te, Yu. A.; Garevskikh, I. A.; Maksimenko, V. D.; Speranskiy, B. S.

TITLE: Problems of crystallization of electroslag-melted ingots

SOURCE: IVUZ. Chernaya metallurgiya, no. 5, 1963, 76-80

TOPIC TAGS: electroslag melting, ball-bearing steel, impurities, nonmetallic inclusions, ingot diameter effect, bath depth effect, solidification rate

ABSTRACT: The Zaporozhskiy Mashinostroitel'nyy Institut (Zaporozh'ye Machine Building Institute) in cooperation with the Dneprospetsstal' Plant has studied the process of ingot crystallization in electroslag melting in an attempt to determine melting conditions that would ensure the best metal quality. Laboratory- and production-scale tests showed that the ratio of ingot diameter D to the depth of liquid metal bath h is the most indicative characteristic of the process, and that  $D/h = 2$  is the optimum value for ingots 100--300 mm in diameter. Higher D/h values indicate that the temperature of metal and slag

Card 1/2



L 9978-63

ACCESSION NR: AP3001376

baths is too low, which leads to poor separation of slag from metal and increased amount of slag inclusions. Lower D/h values mean that the metal and slag temperature is too high, which results in extensive segregation, coagulation of nonmetallic inclusions, and an increased amount of impurities. With increasing ingot diameter, the solidification rate decreases, for instance, from 1.25 cm/min for 100 mm diameter to 0.64 for 300 mm (at D/h = 2). This also promotes segregation. Ingots of ShKh15 steel [AISI E52100] 100 mm in diameter had considerably less segregation and smaller inclusions than ingots 300 mm in diameter. Orig. art. has: 3 figures and 2 tables.

ASSOCIATION: Zaporozhskiy mashinostroitel'nyy institut (Zaporozh'ye Machine Building Institute)

SUBMITTED: 14Aug62

DATE ACQ: 01Jul63

ENCL: 00

SUB CODE: 00

NO REF SOV: 006

OTHER: 000

ph/qy  
Card 2/2

SPERANSKIY, B.S., inzh.; SHUL'TE, Yu.A., doktor tekhn.nauk; KURBATOV,  
M.I., inzh.

Effect of casting temperature on the structure of track shoes  
made of high-manganese steel. Mashinostroenie no. 2:46-47  
Mr-Apr '64. (MIRA 17:5)

SHUL'TE, Yuriy Avgustovich

[Nonmetallic inclusions in electrical steel] Nemetallicheskie vklucheniia v elektrostali. Moskva, Metallurgiya, 1964. 205 p. (MIRA 18:3)

ACCESSION NR: AP4041869

S/0133/64/000/007/0640/0642

AUTHOR: Gabuyev, G. Kh.; Yel'tsov, K. S.; Shul'te, Yu. A.; Mikhaylov, P. A.; Garevskikh, I. A.; Leybenzon, S. A.; Tsivirko, E. I.; Medovar, B. I.; Latash, Yu. V.; Frantsov, V. P.; Pakhomov, A. I.; Kaganovskiy, G. P.; Voinov, S. G.; Shalimov, A. G.; Kalinnikov, Ye. S.; Smolyakov, V. P.; Kosoy, L. F.

TITLE: Improvement of the quality of electrosag-melted ball-bearing steel

SOURCE: Stal', no. 7, 1964, 640-642

TOPIC TAGS: ball bearing steel, electrosag melted steel, high purity steel, steel electrosag melting

ABSTRACT: Several variants of electrosag melting have been tested in an attempt to improve the quality of ball-bearing steel. The analysis of electrosag-melted steel showed that nitrides and carbonitrides constitute the greatest part (up to 75%) of the nonmetallic inclusions present in the steel. These nitrides derive from the initial material. The electrosag process eliminates large nitrides over 20 $\mu$  in diameter, but does not eliminate the smaller ones.

Card 1/3

ACCESSION NR: AP4041869

Therefore, the nitrogen and titanium contents of the initial metal must be reduced to a minimum. This can be done, for example, by refining the metal in the ladle with synthetic slag. Electroslag melting of open-hearth steel refined with synthetic slag eliminated all the inclusions larger than  $10\mu$  and reduced the number of smaller inclusions by more than 50% and the nitrogen and oxygen contents to 0.0053 and 0.0020%, respectively. To produce ultra-high purity ball-bearing steel, the double electroslag melting was applied with a combination of various fluxes. The use of ANF-6-ANF-6 fluxes in double electroslag melting or of AN-29-ANF-6 fluxes produced best results. Ultra-high purity steel, fully satisfying requirements for critical ball bearings, was obtained. Orig. art. has: 2 figures.

ASSOCIATION: Dneprospetsstal' (Dneprospetsstal' plant); Zaporozhskiy mashinostroitel'nyy institut (Zaporozh Machine-Building Institute); Institut elektrosvarki im Ye. O. Patona (Electric Welding Institute); TsNIICHM

Card 2/3

ACCESSION NR: AP4041869

SUBMITTED: 00

SUB CODE: MM

ATD PRESS: 3068

NO REF SOV: 007

ENCL: 00

OTHER: 000

Card 3/3

KARPENKO, G.V.; STEPURENKO, V.T.; BABEY, Yu.I.; SHUL'TE, Yu.A.; MIKHAYLOV,  
P.A.

Corrosion resistance and fatigue strength of ShKh15 steel refined  
by the electric slag method. Vliian.rab. sred na svois. mat. no.2:  
67-76 '63. (MIRA 17:10)

SHUL'ITE, Yu.A.; GLADKIY, S.I.; BARYSHEVSKIY, L.M.; BERKUN, M.N.;  
IUNEV, V.V.; SAPELKIN, A.I.; VOLCHOK, I.P.; SHEVCHUK, P.T.;  
KURBATOV, M.I.

Heat treatment of medium-carbon steel castings. Lit. proizv.  
no.4:9-10 Ap '64. (MIRA 18:7)



SMOLYAKOV, V.F.; SHULTE, Yu.A.; MEDOVAR, B.I.; GAREVSKIKH, I.A.;  
LATASH, Yu.V.; TSIVIRKO, E.I.; ZARAIYEV, Yu.I.; TOPCHIY, S.F.

Nonmetallic inclusions in electric slag refined 12Kh2N4A  
structural steel. Met. i gornorud. prom. no.4:35-37 J1-Ag '64.  
(MIRA 18:7)

L 56456-65 - EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b) MJW/JD

ACCESSION NR: AP5018807

UR/0304/64/000/005/0032/0033

AUTHOR: Sherstyuk, A. A. (Engineer); Shul'te, Yu. A. (Doctor of technical sciences);  
Kurbatov, M. I. (Candidate of technical sciences)

TITLE: Cold brittleness of high-manganese steel

SOURCE: Mashinostroyeniye, no. 5, 1964, 32-33

TOPIC TAGS: manganese steel, metal brittleness, cooling

Abstract: The physical and mechanical properties of cast high-manganese steel at low temperatures have been studied insufficiently. Many instances of breakage of parts and units of machines made of high-manganese steel caused by its cold brittleness are known. For this reason, the properties of this steel at low temperatures and the influence of its composition and engineering factors on cold brittleness were studied.

A series of samples for tensile and impact testing of one initial melt were tested in a range of temperatures of from +200 to -196 C. At each temperature, at least three samples were tested, in which cases, as a rule, the agreement of the data was satisfactory. The samples were cooled in a liquid nitrogen and alcohol mixture for 30 minutes.

Toughness, ductility and tensile strength decreased commensurate with the lowering of temperature.

Card 1/4

L 56456-65

ACCESSION NR: AP5018807

Phosphorus has the greatest influence on cold brittleness. Steels with phosphorus content of 0.034 and 0.090% are highly susceptible to cold brittleness. The cold brittleness threshold (50% loss of properties) of low-phosphorus steel was lowered to  $-140^{\circ}\text{C}$  as compared to  $-20^{\circ}\text{C}$  for steel of a conventional composition. This occurs because as the phosphorus content in steel increases, the boundaries of austenite grains are contaminated with inclusions of the phosphoride eutectic causing a marked drop in the mechanical properties of the steel.

Carbon lowers cold brittleness of a steel considerably, therefore, carbon content should not exceed 1.3%. Manganese, within the analysis limits of type GI3L steel and Mn/C ratio have no appreciable influence.

The influence of modifiers of aluminum, silicon calcium, silicon zirconium, ferrotitanium, ferrocerium and their combinations on cold-brittleness of steel was studied.

When the amount of aluminum is increased from 0.04 to 0.3%, ductility and impact strength of the steel are decreased and cold brittleness is correspondingly increased, especially when the content of aluminum is greater than 0.2%.

Card 2/4

L 56456-65

ACCESSION NR: AP5018807

Adding 0.25% silicon calcium (case 2) with 27% calcium have no effect on the properties of the steel.

The modification of silicon zirconium had no appreciable influence on the cold brittleness and properties of the steel.

Admixtures of ferrotitanium (0.1% Ti) refined the steel structure into finer grains and increased impact strength and ductility by 10-15% and corresponding increased cold brittleness.

The use of a complex modifier (0.1% al, 0.1% Casi, and 0.1% ferro-cerium) had no significant effect on cold brittleness of the steel.

At the temperature of liquid nitrogen, steel GI3L becomes brittle independent of its composition. However, when this occurs, there is no transformation of austenite into martensite. Tests made at +20°C after cooling in nitrogen showed the samples to have the usual properties.

Thus, the way to increase the cold brittleness of cast steel GI3L is to lower the phosphorus content in it.

Castings of high-manganese steel, operating at low temperatures, should be made only from low-phosphorus steel with the use of low-phosphorus (up to 0.05%) grades of ferromanganese.

Orig. art. has 1 graph and 1 table.

Card 3/4